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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte CHESTER LEDLIE SANDBERG,
HAROLD J. VINEGAR, CHRISTOPHER KELVIN HARRIS,
JAIME SANTOR SON and
FREDERICK GORDON CARL JR.

Appeal 2010-001040
Application 10/693,700
Technology Center 3700

Before LINDA E. HORNER, JOHN C. KERINS and
STEVEN D.A. McCARTHY, *Administrative Patent Judges*.

McCARTHY, *Administrative Patent Judge*.

DECISION ON APPEAL

The Appellants[1] appeal under 35 U.S.C. § 134 from the Examiner's decision finally rejecting claims 1691-94, 1696-1713, 1715-32 and 1734-49 under 35 U.S.C. § 103(a) as being unpatentable over Eastlund (US

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[1] The Appellants identify the real party in interest as Shell Oil Company.

4,716,960, issued Jan. 5, 1988); either Van Egmond (US 5,065,818, issued Nov. 19, 1991) or Bell (US 4,382,469, issued May 10, 1983); and Rose (EP 0 130 671 A2, publ. Jan. 9, 1985). The Examiner also provisionally rejects claims 1691-94, 1696-1713, 1715-32 and 1734-49 for non-statutory obviousness-type double patenting as being unpatentable over one or more of claims 1691-96, 1698-1716, 1718-34 and 1736-53 of Sandberg '820 (US Appl'n 10/693,820, filed Oct. 24, 2003, publ. Jul. 29, 2004 as US 2004/0144540 A1) and claims 1691-94, 1696-1701, 1704-18, 1720-42 and 1744-59 of Sandberg '840 (US Appl'n 10/693,840 , filed Oct. 24, 2003, publ. Jul. 2, 2002 as US 2005/0238461). Counsel for the Appellants presented oral argument on November 17, 2011. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE the final rejection of claims 1691-94, 1696-1713, 1715-32 and 1734-49. We do not reach the provisional rejection of these claims.

Claims 1691, 1710 and 1729 are independent. Claim 1691 recites:

> 1691. A system configured to heat a hydrocarbon containing formation, comprising:
>
> a heater well extending from a surface of the earth through an overburden of the formation and into a hydrocarbon containing layer in the formation; and
>
> an AC supply configured to provide AC at a frequency between about 100 Hz and about 1000 Hz;
>
> one or more electrical conductors located in the heater well, at least one of the electrical conductors extending from the surface into the hydrocarbon containing layer, and at least one of

> the electrical conductors being electrically coupled to the AC supply;
>
> at least one electrical conductor comprising an electrically resistive ferromagnetic material, the electrical conductor being configured to provide an electrically resistive heat output during application of AC to the electrical conductor, and the electrical conductor being configured to provide a reduced amount of heat above or near a selected temperature, the selected temperature being within about 50°C of the Curie temperature of the ferromagnetic material; and
>
> wherein the system is configured to provide heat to the hydrocarbon containing formation such that sufficient heat transfers from at least one of the electrical conductors to hydrocarbons in the hydrocarbon containing formation to at least mobilize some hydrocarbons in the formation.

Claim 1691 and 1710 each recite a system "configured to provide heat to the hydrocarbon containing formation such that sufficient heat transfers from at least one of the electrical conductors to hydrocarbons in the hydrocarbon containing formation to at least mobilize some hydrocarbons in the formation." The latter recitation limits the system to one which not merely heats hydrocarbons which originated in the hydrocarbon containing formation, but heats the hydrocarbons while the hydrocarbons are in the formation. This interpretation is consistent with the disclosure of the Specification.

On the other hand, an interpretation of the term broad enough to encompass heating hydrocarbons which originated in the hydrocarbon containing formation while the hydrocarbons are outside the formation would be inconsistent with the recitation in the preamble of each claim of a

system "configured to heat a hydrocarbon containing formation." Such an interpretation also would be inconsistent with the recitation that the heating is "to at least mobilize some hydrocarbons in the formation." (*Cf.* App. Br. 9 (arguing that "Eastlund only teaches the heating of fluids that have **already** been mobilized and have moved into the well tubing through perforations 12 (Figure 1) or perforations 113 (Figure 7A)." Emphasis in original.).)

Claim 1729 recites a method of heating a hydrocarbon containing formation. The method also includes "allowing heat to transfer from the electrical conductors to hydrocarbons in the hydrocarbon containing layer to at least mobilize some hydrocarbons in the layer." For reasons similar to those discussed in the last paragraph of this opinion, the step is limited to allowing heat to transfer from the electrical conductors to hydrocarbons while the hydrocarbons are in the hydrocarbon containing layer.

Eastlund describes a well having an upper tubing section *13a* and a lower tubing section *13b* suspended in a casing *10*. (*See* Eastlund, col. 3, ll. 20-24.) A lead *19* electrically connects a power source with the lower tubing section *13b*. (*See* Eastlund, col. 3, ll. 64-68.) Another lead *21* electrically connects the power source with a wellhead. (*See* Eastlund, col. 4, ll. 6-7.) The casing *10* is secured to the wellhead. (*See* Eastlund, col. 3, ll. 13-15.) A "scratcher" *17* electrically connects the lower tubing section *13b* and the casing *10* to complete an electrical circuit at and above the scratcher *17*. (*See* Eastlund, col. 3, ll. 55-63.)

Eastlund teaches using an electrical circuit to heat the tubing to prevent solids such as paraffin from depositing within the tubing. (*See* Eastlund, col. 4, ll. 22-25). Eastlund teaches connecting the casing *10* and

the lower tubular section *13b* below the normal level of solids formation in the tubing. (*See* Eastlund, col. 3, ll. 40 and 51-52.) Nevertheless, Figure 1 of Eastlund implies that the scratcher *17* defines the lowest extent of the electrical circuit significantly above the hydrocarbon containing formation as indicated by the casing perforations *12*. (*See* Eastlund, col. 3, ll. 17-19.) The Examiner does not provide a sound, non-conclusory basis for finding that the electrical circuit is capable of heating hydrocarbons in the hydrocarbon containing formation. (*See generally* Ans. 3 and 6-8; *see also* App. Br. 9-10.)

Van Egmond describes a heater "particularly useful in enhanced recovery of heavy oils from oil bearing strata, and in recovery of hydrocarbons from oil shales." (Van Egmond, col. 2, ll. 6-8.) The heater includes heating cables *1*, *2*. (*See* Van Egmond, col. 3, ll. 35-37.) Figure 1 of Van Egmond depicts the cables *1*, *2* as extending from the surface to heat a subterranean zone 2 located below the overburden. (*See* Van Egmond, col. 3, ll. 32-24.)

Bell teaches a method for producing fuel gas from an underground formation of carbonaceous material. The method includes contacting the carbonaceous material with an aqueous electrolyte and passing a controlled amount of direct current through the formation to produce the gas by electro-chemical action. (Bell, col. 2, l. 54 – col. 3, l. 2.)

The Examiner concludes that:

> it would have been obvious . . . to adapt Eastlund with the heater well that extends through an overburden formation and into the hydrocarbon containing formation at least about 10 m or more to effectively heat such hydrocarbon containing layer.

(Ans. 4.) The problem with this conclusion is that Eastlund's electrical circuit is designed to heat and mobilize hydrocarbons within the tubing rather than in a hydrocarbon containing formation. The adaptation that the Examiner proposes would require adapting Eastlund's circuit to address a problem for which the circuit was not designed. Van Egmond and Bell describe different systems for addressing different problems. The Examiner's reasoning does not persuade us that the teachings of either Van Egmond or Bell would have provided one of ordinary skill in the art reason to try to adapt an electrical circuit such as that described by Eastlund to heat hydrocarbons in a hydrocarbon containing formation. (*See* App. Br. 11-12.)

The Examiner correctly finds that Rose describes "a heating element having an inner core made of copper with an outer conductor made of a resistive ferromagnetic carbon steel which allows the heating element to be self-regulating." (Ans. 4; *see also* Rose 9, ll. 1-18.) Rose does not appear to suggest use of the heater for heating hydrocarbons in a hydrocarbon containing formation. Rose does not remedy the deficiencies in the combined teachings of Eastlund with Van Egmond or Bell. We do not sustain the rejection of claims 1691-94, 1696-1713, 1715-32 and 1734-49 under § 103(a) as being unpatentable over Eastlund; Van Egmond or Bell; and Rose.

The Examiner also provisionally rejects appealed claims 1691-94, 1696-1713, 1715-32 and 1734-49 for non-statutory obviousness-type double patenting as being unpatentable over one or more of claims 1691-96, 1698-1716, 1718-34 and 1736-53 of Sandberg '820 and over one or more of claims 1691-94, 1696-1701, 1704-18, 1720-42 and 1744-59 of Sandberg '840. The Appellants do not contest this rejection. Instead, the Appellants

represent that they will provide a terminal disclaimer once the application underlying this appeal is in condition for allowance. (*See* App. Br. 24.) Based on this representation, we do not reach the provisional rejection. Nevertheless, we note that Sandberg '820 and Sandberg '840 appear to have the same filing date as the application underlying this appeal. We direct the Examiner's attention to the second paragraph of § 804 I.B.1. of the MANUAL OF PATENT EXAMINING PROCEDURE.

DECISION

We REVERSE the Examiner's decision finally rejecting claims 1691-94, 1696-1713, 1715-32 and 1734-49.

We do not reach the Examiner's decision provisionally rejecting claims 1691-94, 1696-1713, 1715-32 and 1734-49.

REVERSED

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